REMARKS

The Office action dated April 11, 2001 has been carefully considered. In the Office action, Claims 1-18 were rejected under 35 U.S.C. 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Further, claims 5, 6, and 11 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 2, 7, 8, 13 and 14 (and presumably 12, 15 and 17) were rejected under 35 U.S.C. 103(a) as being unpatentable over Crane et al., U.S. Patent No. 4,718,102 (hereinafter Crane). Claims 3, 9, 16 and 18 (and presumably 4-6, 10 and 11) were rejected under 35 U.S.C. 103(a) as being unpatentable over Crane as applied to claims l, 7 and 13 above, and further in view of Guo et al. "Classification trees with neural network feature extraction," Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992 (hereinafter Guo). By the present amendment, claims 1, 5, 6, 11 and 13 have been amended, and the rejections traversed in view of the following remarks. Reconsideration is respectfully requested.

Considering first the §112, first paragraph rejection, applicants strongly disagree with this rejection and the related conclusions in the Office action, and submit that the Examiner has not come close to meeting the initial burden required by law to establish a reasonable basis to question the enablement provided for the claimed invention. As set forth in the MPEP:

> In order to make a rejection, the examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. In re Wright, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993) (examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure). A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement of 35 U.S.C. 112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. Doubt may arise about enablement because information is missing about one or more essential parts or relationships between parts which one skilled in the art could not develop without undue experimentation. In such a case, the examiner should specifically identify what information is missing and why one skilled in the art could not supply the information without undue experimentation. See MPEP § 2164.06(a). References should be supplied if possible to support a prima facie case of lack of enablement, but are not always required. In re Marzocchi, 439 F.2d 220, 224, 169 USPQ 367, 370 (CCPA 1971). However, specific technical reasons are always required.

MPEP § 2164.04.

In making the rejection, the Office action fails to specifically identify what information is missing and why one skilled in the art could not supply the information without undue experimentation, and further provides none of the required technical reasons. Instead, the Office action essentially bases its rejection on a conclusion that because the application provides "no other embodiment other than a CART tree" for a secondary recognizer, that the present invention requires a CART tree, and still further, because "optimal" CART trees are not provided, these claims are not enabled. This conclusion is completely incorrect for a number of reasons.

First, a CART tree is not even required as a secondary recognizer in many of the rejected claims, for example, claims 1, 7 and 13. As explained in the MPEP:

> As long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied. *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). Failure to disclose other methods by which the claimed invention may be made does not render a claim invalid under 35 U.S.C. 112. *Spectra-Physics, Inc. v Coherent, Inc.*, 827 F.2d 1524, 1533, 3 USPQ2d 1737, 1743 (Fed. Cir.), cert. denied, 484 U.S. 954 (1987).
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> MPEP § 2164.01(b).

Limiting the present invention to CART trees, as the Office action is apparently attempting to do, indicates a fundamental misunderstanding of the scope of many of the claims of the present invention, which are not limited to CART trees (let alone how they are trained). Claims 1, 7 and 13, for example, are generally directed to selecting a secondary recognizer, if available, based on a shape index output by a primary recognizer in response to a chirograph being input thereto, wherein the selected secondary recognizer further differentiates features of that chirograph to make a final determination as to a recognition result corresponding to the chirograph. This has nothing to do with the way in which that secondary recognizer was trained, nor are the claims limited any particular type of secondary recognizer. In fact, claims 1, 7 and 13, for example, correlate quite closely to the specification's written description explaining FIG. 11, and, although FIG. 11 uses the example of a CART tree, the specification clearly points out (see e.g., page 3, line 18 of the specification) that a CART tree is but one example of a secondary recognizer that can be employed. Those skilled in the art understand that other types of secondary recognizers can be substituted, as long as those secondary recognizers can independently determine a recognition result from a chirograph, as discussed below. What is essentially

being claimed is that the primary recognizer outputs a shape index, which is used to select a secondary recognizer that will then independently determine the recognition result from the chirograph. Any type of secondary recognizer that can do this will suffice. Thus, because the specification clearly discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, the enablement requirement of 35 U.S.C. 112 is undoubtedly satisfied, and the Office action's §112, first paragraph rejection is clearly improper by law.

Moreover, for those claims reciting a CART tree, applicants submit that the training of a CART tree as described in the specification is sufficiently enabling to one of ordinary skill in the art. For one, conceiving of suitable questions relevant to splitting samples of chirographs is neither a difficult nor a time-consuming task for one skilled in the art. For another, the present invention describes in explicit detail the method and mechanism that automatically evaluates the quality of each such question, essentially making the training aspect of the invention anything but undue experimentation.

First, it simply is not difficult or time consuming, and thus does not require undue experimentation, for one of ordinary skill in the art to conceive of relevant questions to apply when provided with various chirographs. At the same time, the law is clear that a patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*,802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984). In

fact, it would be ludicrous to suggest that every possible relevant question that may be conceived of by one skilled in the art for every possible chirograph needs to be listed in the specification to make the specification enabling, yet this appears to be what the Office action is suggesting in seeking an "optimal" use of a CART tree. Further, the specification even goes *beyond* what is necessary by law, by giving three examples of the types of questions that can be used, ("how many total strokes in the chirograph?", "what is the length of the first stroke?" and/or "what is the angle of the third stroke with respect to the first stroke?"), for guiding those of lesser skill in the art.

Instead of providing the required specific technical reasons to meet its burden, such as some factual evidence or a reference as to why one skilled in the art would be unable to conceive of relevant questions (which of course those skilled in the art can easily do), the Office action is attempting to rely on applicants' observation (well-understood by those skilled in the art) that when constructing a CART tree, "there is no standard set of questions, only questions based on the experience and observations of those skilled in the art." In fact, read fairly, this statement indicates that those skilled in the art are fully capable of conceiving of relevant questions, and the conclusion in the Office action that "one of ordinary skill in the art would not know to what degree of questioning or which questions to ask that would provide an optimal use of the CART tree" (and thus would require undue experimentation) is unfounded. Since conceiving of such relevant questions is neither difficult nor time-consuming, but rather is basic common sense for one of ordinary skill in the art, and it simply does not follow that conceiving of such questions requires undue experimentation on the part of one skilled in the art.

The Office action thus appears to be attacking the known fact that there is can be no standard set or quantity of questions, nor anything such as an optimal CART tree, apparently in an attempt to substitute for specific technical reasoning an unsupported allegation that undue experimentation would be needed to provide an "optimal" use of a CART tree in the present invention. In fact, those skilled in the art understand that there is no one "optimal" method, nor can there be an "optimal" set of questions that can be listed, only questions believed to be relevant for a given sample set. Relevant questions would necessarily vary for any given situation; for example, questions for one set of sample chirographs would not necessarily be good for another sample set, something which is well understood by those skilled in the art. In fact, listing such questions for one sample set would most likely be irrelevant, if not harmful, to someone attempting to construct a CART tree for a different sample set, and almost certainly would not result in a more optimal CART tree for that other set. Further, the lack of any optimal question set is clear from the specification, which explains that as additional questions are conceived, those questions can be simply tried against the others to determine if they improve the homogeneity of a given split and thus the accuracy of the mechanism. This technique of conceiving of a relevant question to see if it improves the homogeneity of a given split and thus the accuracy of the mechanism, which is described in explicit detail in the specification, is hardly undue experimentation.

Indeed, once a question is conceived, the present invention provides an explicitly described method and mechanism that automatically evaluates the quality of each such question, essentially making the training aspect of the invention anything but undue

experimentation. Note that because of the specification's explicit description of how a given question is evaluated, (e.g., evaluate the split to see if a given question helps or not), any such experimentation would be merely routine, which is not undue experimentation. *See, e.g., In re Wands,* 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988) (citing *In re Angstadt,* 537 F.2d 489, 502-04, 190 USPQ 214, 217-19 (CCPA 1976)).

In sum, all of the claims do not require a CART tree, nor its training, while those that do are clearly enabled by the specification. If the Examiner continues to maintain this rejection, then applicants specifically request that the Examiner meet the law's required burden with some factual evidence, beyond a mere allegation, as to why one skilled in the art would be unable to conceive of such relevant questions, and, since the method of the present invention determines each such question's merit with respect to splitting the tree, why constructing a tree in this manner would require undue experimentation. Lastly, if the rejection is maintained, applicants also request an explanation clarifying the meaning and any relevance of the statement in the Office action, "Further, the specification provides no information to the public on how the CART tree implementation can be improved upon and therefore advances technology because minimal information regarding the questions solved by the CART trees is provided," which applicants submit is not reasonably understandable. For example, is the statement suggesting that applicants need to improve on their own novel and nonobvious CART tree implementation? How does the fact that the specification advances technology work against applicants' invention? Why is the information regarding the questions solved by the CART trees being considered as

minimal, when in fact such questions vary from sample to sample, yet are easily conceived of by those skilled in the art? An explanation is respectfully requested.

Considering next the §112, second paragraph rejections of claims 5 and 6, these claims (and similarly claim 11) have been amended as essentially suggested in the Office action to more particularly point out and distinctly claim the subject matter. Applicants submit that these claims are not indefinite or vague, and reconsideration is respectfully requested.

Turning to the rejections on the art, the claims of the present invention are directed to a primary and secondary recognizer, wherein essentially, the recognition decision of the primary recognizer (output in the form of a shape index, such as a code point) is used to select the secondary recognizer. Significantly, as essentially recited in each of the claims of the present invention, once selected, the secondary recognizer's recognition result is determined independent of the output of the primary recognizer. For example, unlike the prior art, a code point (character) determined by the secondary recognizer is not required to be one of a limited subset of possible characters determined by the primary recognizer, but rather can produce any result it is capable of outputting. By way of example, consider a primary recognizer that is configured to output a code point, (wherein as well understood in the art and consistent with the present invention's specification and claims, a code point is a numerical value representing a character, symbol or the like in a format that is used by computing devices, such as an ASCII or Unicode value). The primary recognizer may recognize a chirograph as the letter A. With present invention, if a secondary recognizer exists that is indexed by that letter A, that "A" secondary recognizer

is selected. However, once selected, the secondary recognizer makes a determination as to what code point to return independent of the primary recognizer's output. In other words, once the primary recognizer's output is used to select the secondary recognizer, the secondary recognizer's determination is not bound by any earlier decision of the primary recognizer. Thus, although a secondary recognizer might be *selected* because the primary recognizer thought a chirograph was the letter A, that secondary recognizer could output the letter A, the letter R, the number 4, or any other code point it deemed correct, regardless of anything the primary recognizer thinks the output should be.

Notwithstanding the above example, the present invention is not limited to primary recognizers that output code points recognizable as characters, symbols or the like, but instead can work with primary recognizers that output any shape index when presented for a given chirograph. Thus, for example, when presented with a chirograph, a primary recognizer can output a shape index of A2 for what it believes is a two-stroke "A" character, or a shape index of A3 for what it believes to be a three-stroke "A" character. Depending on which shape index is output, either an A2 (two-stroke A) secondary recognizer or A3 (three-stroke A) secondary recognizer is invoked. Note that this is simply an example, as virtually any scheme for identifying shape indexes may be employed, with at least some shape indexes each having a corresponding secondary recognizer. For example, another primary recognizer could output a shape index of 459 for a given chirograph, for example, so that a secondary recognizer number corresponding to an index of 459 would be selected to determine the chirograph's meaning. Note that the above

discussion is for illustrative purposes only, and should not be used to limit the claims, which are discussed below.

In contrast to the present invention, Crane (like Filipski, discussed in applicants' prior response) teaches that any later (e.g., secondary) recognition result necessarily *depends* on the primary recognizer's output, which in the case of Crane consists of a subset of member characters, (a confusion set), one of which will be determined to be correct. Before addressing this substantial difference, however, some observations regarding incorrect interpretations set forth in the Office action regarding Crane's teachings and those of applicants will be addressed, since the claim rejections are largely based on these misinterpretations. First, the Office action interprets the stroke shape and sequence of Crane as being analogous to the shape index of applicant. However, while a shape index is a fairly broad concept, the claims and specification essentially specify that it is something output by a primary recognizer that can be used to select a secondary recognizer. Thus, while the present invention could use stroke shape and sequence data as a shape index, Crane teaches *inputting* stroke and sequence data, not outputting it from a primary recognizer, and certainly not for the purpose of selecting a secondary recognizer. In fact, Crane does not output anything like a shape index, but instead outputs a confusion set of characters. Thus, Crane does not teach or suggest that stroke shape and sequence can serve as a shape index output by a primary recognizer, and/or the use of such a shape index to select a secondary recognizer, and only via the impermissible hindsight knowledge gleaned from applicants' teachings would such an interpretation be possible. It

is impermissible by law to use applicants' teachings in order to modify a reference and thereby reject applicants' claims.

Second, the Office action states that "the code points of the instant invention are equivalent to any of the following: the interstroke distance, intrastroke distance, contour length, intercepts or level of stroke complexity data of Crane (col.6, II. 12-20, col. 20, 11.61-63)." This is an incorrect interpretation. As discussed above, a code point is a numerical value used by a computer to represent a character, command, or the like, such as an ASCII value, or a Unicode value. Thus, a code point as claimed is not the same as or in any way even analogous to the interstroke distance, intrastroke distance, contour length, intercepts or level of stroke complexity data of Crane, which is *input* data with respect to recognition. Moreover, as recited in claim 1, for example, a code point is *output* by the secondary recognizer, and is not input data analyzed by a recognizer. In claim 2 the shape index may comprise a code point, but if so, the code point may be used to *select* a secondary recognizer, not fed as input thereto. In short, the code point recited in (some of) the claims is not in any way the same as or analogous to the interstroke distance, intrastroke distance, contour length, intercepts or level of stroke complexity data described at column 6, lines 12-20 or column 20, lines 61-63 of Crane.

Returning to the many differences of Crane from the present invention, one very significant difference is that Crane fails to teach or even suggest the ability of a secondary recognizer to independently determine its own recognition result, not one bound to a subset of characters (the confusion set) of a primary recognizer. More particularly, Crane teaches that in one part of recognition, (essentially dictionary matching, performed first in

"forward processing"), a confusion set is identified. Crane, column 6, lines 27-31. This confusion set, at an absolute minimum, is required to be a two character confusion set. Crane, column 4, lines 58-61. Significantly, the further recognition performed in Crane is limited to returning one of the characters in the confusion set. More particularly, the disambiguation routines operate on the characters in the confusion set to determine which one will be identified as the recognized one. As taught by Crane:

> Disambiguation: (or non-algorithmic phase). Routines associated with each dictionary entry intended to *eliminate all but a unique confusion set member*. In forward processing disambiguation is applied for each entry in a confusion set. In other processing order disambiguation routines may be more generally applied.
> *Crane*, column 11, lines 27-32 (emphasis added).

> Once the confusion set has been identified, the nonalgorithmic processes are applied to selected elements of each designated entry. For each designated entry, corresponding disambiguation routines are applied to compare relative positions of strokes, groups of strokes, or radicals or of any positions within a stroke or strokes. Other disambiguation routines may measure for example contour length, intercepts, or level of stroke complexity. *To identify a character*, every disambiguation routine associated with at least one *entry representative of the character* must produce a true indication and at least one disambiguation routine associated with each other entry in the confusion set must produce a false indication.
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> *Crane*, column 20, lines 55-69 (emphasis added).

By teaching that the ultimate output is *dependent* on one the choices output by the primary recognizer, Crane thus directly teaches away from the claims, which each essentially recite an independent determination (with respect to the primary recognizer output) by the secondary recognizer.

In sum, Crane, teaches that one of the entries of the confusion set output by the primary recognizer must be recognized as the character, and thus fails to teach, suggest or provide any motivation for the claimed subject matter, which essentially recites an independent determination by the secondary recognizer. The difference is significant for many reasons. For example, unlike Crane, not binding a subsequent recognizer to the determination made by a prior recognizer provides substantial flexibility, such as the input to the primary recognizer not being limited to the same type of data that the secondary recognizer outputs, e.g., the present invention could translate one language to another, a shape to a word, and so forth, because the recognition result of the secondary recognizer is independent of the recognition performed by the primary recognizer. For at least the foregoing reasons, applicants submit that the claims are patentable over Crane, and respectfully request reconsideration and withdrawal of these rejections.

Further, because Crane teaches away from the claimed subject matter, Crane cannot be permissibly combined with another reference to support an obviousness rejection. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983); MPEP § 2145. For at least this reason, the rejections of claims 3, 4-6, 9-11, 16 and 18 based on the combination of Crane and Guo are impermissible by law.

Notwithstanding, even if somehow permissible to combine these references, (which it is clearly not), applicants submit that the subject matter of these claims is not reached by the combination. Among other reasons, like Crane, Guo also does not teach selection of a secondary recognizer based on a shape index output by a primary recognizer, and/or a determination independent of a primary recognizer's output. Notwithstanding, the Office

action has attempted to interpret the confusion set as possibly being used to identify a CART tree, by alleging that "the corresponding value indicative of a CART could as easily be the value designating the entry in the confusion set."

However, nothing taught by Crane or Guo reasonably support such an allegation, which in fact is contrary to the explicit teaching in Crane that the disambiguation routines "eliminate all but a unique confusion set member." For example, there are multiple such confusion members, and thus given the Office action's interpretation, if somehow combined there would be multiple CART trees providing multiple results, which would be exactly opposite Crane's explicitly expressed purpose of "eliminat[ing] all but a unique confusion set member." Thus, the Office action's proposed modification of Crane would render Crane unsatisfactory for its intended purpose as stated therein, and thus cannot be correct. *See In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Moreover, it is clear from the usage of the term "could" in the Office action that the Office action recognizes that Crane and Guo are deficient in providing such a teaching or suggestion, which indicates that the Office action is relying solely on applicants' teachings in an attempt to patch up this clear deficiency. The use of applicants' teachings in order to reconstruct applicants' claimed invention is impermissible by law.

For at least the foregoing reasons, applicants submit that it is not permissible to combine Crane with Guo, but even if somehow permissible to combine, the claims still recite patentable subject matter over the combined teachings of these references. Applicants respectfully request withdrawal of the §103(a) rejections of claims 3, 4-6, 9-11, 16 and 18 based on Crane and/or Guo.

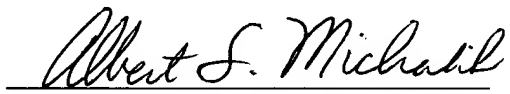
CONCLUSION

In view of the foregoing remarks, it is respectfully submitted that claims 1-18 of the present application are patentable over the prior art of record, and that the application and claims are otherwise in good and proper form for allowance. A favorable action on the part of the Examiner is earnestly solicited.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney at (425) 653-3520.

Signed at Bellevue, in the County of King, and State of Washington, September 11, 2001.

Respectfully submitted,



Albert S. Michalik, Reg. No. 37,395
Attorney for Applicants
MICHALIK & WYLIE, PLLC
14645 Bel-Red Road
Suite 103
Bellevue, WA 98007
Telephone: (425) 653-3520
Facsimile: (425) 653-3603

Appendix A
(marked up copy of the claims amended herein)

1. (Amended) A method of recognizing chirographs input into a computer system, comprising [the steps of]:

providing a primary recognizer for converting chirographs to shape indexes, the primary recognizer providing output including a shape index when a chirograph is input thereto;

providing a plurality of secondary recognizers to convert chirographs into code points, and associating the secondary recognizers with at least some of the shape indexes[, each secondary recognizer capable of overriding a shape index provided by the primary recognizer];

receiving a chirograph;

providing the chirograph to the primary recognizer and receiving a shape index therefrom;

determining whether one of the secondary recognizers is associated with the shape index, and if so, selecting that secondary recognizer as a selected secondary recognizer; and

passing the chirograph to the selected secondary recognizer, the secondary recognizer [and] returning a code point from the secondary recognizer, the code point returned by the secondary recognizer determined independent of the output of the primary recognizer.

5. (Amended) The method of claim 4 wherein training the secondary recognizers further comprises [applying a plurality of questions to the chirographs] determining a plurality of distinguishing features of chirographs based on predetermined criteria.

6. (Amended) The method of claim 5 wherein the predetermined criteria correspond to questions, and wherein training the secondary recognizers further comprises determining a question ordering by measuring the quality of each question.

11. (Amended) The method of claim 10 wherein training the secondary recognizer further comprises [applying one of a plurality of questions to the chirographs] determining a plurality of distinguishing features of chirographs based on predetermined criteria.

13. (Amended) A system for recognizing chirographs input into a computing device, comprising:

a primary recognizer configured to determine a shape index from a chirograph;

a plurality of secondary recognizers, each secondary recognizer corresponding to a shape index;

an interface configured to receive a chirograph and provide it to the primary recognizer, the primary recognizer causing selection of a selected secondary recognizer based on a determined shape index corresponding to the chirograph[,]; and

the selected secondary recognizer determining a recognition result from the chirograph and returning the recognition result, wherein the returned recognition result is determined by the secondary recognizer independent [need not correspond to a value] of the shape index determined by the primary recognizer.